

Trans-Lake Washington Project EIS

Methodology Report – 6/10/02

Geology and Soils

Guiding Plans and Policies

- King County Critical Areas Ordinance
- Land use codes and Sensitive/Critical Areas overlays for Seattle, Medina, Hunts Point, Yarrow Point, Clyde Hill, Kirkland, Bellevue, and Redmond
- Unified Building Code, 1997, for structures requiring human occupancy
- U.S. Army Corps of Engineers regulations governing work in navigable waterways
- WSDOT Environmental Procedures Manual, Section 420, July 2001

Data Needs and Sources

- U.S. Geological Survey geologic maps overlaid with the proposed alternatives. GIS system plots are acceptable.
- King County geologic hazards maps overlaid with the proposed alternatives. GIS system plots are acceptable.
- City of Redmond geologic hazards maps, available from the City of Redmond Community Development Guide, overlaid with the proposed alternatives.
- As-built foundation plans for the existing walls and structures, transposed onto the proposed alternatives and stationing.
- Existing subsurface exploration logs, subsurface profiles, and geotechnical reports along the route, available from:
 - Washington State Department of Transportation (WSDOT) geotechnical archives at the Olympia Service Center
 - Sound Transit
 - University of Washington
 - Published papers on topics such as the construction of I-5 through the Capitol Hill area, geology along the Seattle highway system, geology of the navigable waterways in the Puget Sound area, and historical accounts of the construction of the ship canal
- A geologic field reconnaissance of the study area to identify major geologic and topographic features.

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- Subsurface explorations near the Montlake interchange and potentially other locations where lack of subsurface information could influence structure type.

King County Soil Survey maps will NOT be used for analysis. Most of the soils along the SR 520 corridor have been altered by development since the maps were published in 1973. Geologic mapping and information from subsurface explorations can be used to assess erosion and infiltration potential, conditions commonly estimated from agricultural soil maps.

Proposed Coordination with Agencies

Geotechnical staff from FHWA and jurisdictions within the SR 520 Corridor will be interviewed to gather information on excavation support in the overconsolidated clay and silt materials, such as Lawton Clay, present along the SR 520 corridor. Selected local contractors will also be interviewed about their experience with anchor and cylinder pile construction practices in the overconsolidated clay.

Proposed Coordination with Team, WSDOT, and Sound Transit

To assess geotechnical impacts, coordination will be required with the following team, WSDOT, and Sound Transit members:

- WSDOT geotechnical staff – to discuss approaches for wall design and slope stabilization in the Lawton Clay or similar overconsolidated clay deposits
- WSDOT geotechnical staff – to discuss the need and options for conducting a test anchor program in the Lawton Clay
- Sound Transit – to collect subsurface information relevant to the proposed project
- Team roadway designers – to obtain plan and profile drawings and estimates of cut-and-fill volumes
- Team GIS personnel to perform mapping overlay work
- Team roadway designers and geotechnical engineers – to identify mitigation measures for construction activity and long-term impacts
- Team noise and vibration analyst – to develop noise mitigation for pile driving and other construction noise sources related to wall and footing construction

Study Area

The study area for geotechnical impacts will consist of the proposed footprints for the alternatives and surrounding slopes within a 5H:1V (horizontal:vertical) prism.

Affected Environment Methodology

Data from published maps, reports, and subsurface explorations will be combined with information from any completed subsurface explorations and testing and the geologic field reconnaissance to develop a description of the affected environment, including geology, location of potential geologic hazard areas, and general topographic setting. A description of subsurface conditions will be provided for the various segments of the SR 520 corridor.

Maps of surficial geology and geologic hazards, including erosion, landslide, and seismic hazards, will be provided.

Environmental Consequences Analysis Methodology

The environmental consequences analysis will assess potential direct and construction effects of the proposed alternatives on adjacent properties and downstream areas. General impacts of construction through various subsurface conditions will be described qualitatively. A comparison of alternatives will be made quantitatively by tabulating earthwork volumes provided by the design staff, tabulating lane miles through geologic hazard areas, and tabulating total lane miles; relative impacts can be associated with these quantitative measures.

Direct Impacts

Direct impacts (or effects) are caused by the proposed action or alternative and occur at the same time and place, most often during construction. The following earth-related direct impacts will be analyzed:

- Slope stability
- Ground disturbance and erosion potential
- Topographic alteration
- Approximate export of excess or unsuitable excavation materials
- Approximate import of fill and backfill materials
- Noise and vibrations associated with wall and footing construction
- Temporary construction dewatering
- Settlement or lateral movement of adjacent structures due to excavating, tunneling, or loading during construction

Construction Impacts

Construction impacts will include the direct impacts within the study area, such as waste soil disposal; and use of fill, backfill, and aggregate resources.

Mitigation Measure Methodology

The mitigation discussion will identify potential measures that may be needed to mitigate anticipated impacts. Mitigating measures include design features necessary to allow safe construction and operation of the facility, design measures to protect the stability of upslope and downslope areas, and measures that, with agency consultation, may be implemented to reduce the impact on areas inside or outside the study area. For example, design standards require a retaining wall or cut slope to have a minimum factor of safety, which would act as a mitigating measure. Restricting the hours of pile driving might be an example of a mitigating measure that could minimize offsite noise and vibration impacts. Selecting a drilled shaft foundation type over a spread footing could be an example of mitigating the area of disturbance or disruption of traffic impacts onsite.

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